



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,772	07/30/2002	Markus Fleute	Fleute-1	2310
28581	7590	08/12/2005	EXAMINER	
DUANE MORRIS LLP PO BOX 5203 PRINCETON, NJ 08543-5203			PATEL, SHEFALI D	
			ART UNIT	PAPER NUMBER
			2621	

DATE MAILED: 08/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/088,772	<b>Applicant(s)</b> FLEUTE ET AL.	
	<b>Examiner</b> Shefali D. Patel	<b>Art Unit</b> 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 7/30/02 (preliminary amendment).
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/18/02</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because the box elements in Figures 1 and 5 elements such as 1, 11, 12, 13, 21, etc. need to be labeled in accordance with 37 C.F.R. § 1.83(a) as stated infra. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specifically, 37 C.F.R. § 1.83(a) states that “the drawing in a nonprovisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box).” As mentioned above, please label the box elements in Figures 1 and 5 (such as , elements 1, 11, 12, 12, 21, etc.)

### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on March 18, 2002 has been considered by the examiner. Please note that the references A and B listed on page 1 of 2 have been listed on the form PTO-892 because it lacked even and odd pages, respectively when originally filed.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The last step of claim 1, “selecting a deformation of the model to modify its contours in three dimensions.” is not clear. How much of the modification results from the selection of a deformation?

Art Unit: 2621

What does contour modification entails? These things are not clear from the specification. Specifically, this limitation does not define the origin of the deformation to be selected.

Dependent claims 2-20 are rejected for the same reasons as claim 1.

*Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lavallee et al. (hereinafter, "Lavallee") ("Recovering the Position and Orientation of Free-Form Objects from Image Contours Using 3D Distance Maps," IEEE, 1996, pp. 378-390) in view of Fleute et al. (hereinafter, "Fleute") ("Building a Complete Surface Model from Sparse Data Using Statistical Shape Models: Application to Computer Assisted Knee Surgery", MICCAI, 1998, pp. 879-887).

With regard to **claim 1** Lavallee discloses a method for restoring a three-dimensional image representing the surface contours of at least one object, based on at least one two-dimensional x-ray view of this object (Figure 1 page 378, right-hand column), characterized in that it determines the position of the shooting source in a reference referential system (page 380, left-hand column, section B); selecting a predefined model forming an average shape of the object (page 380, right-hand column, section C); and iteratively, until the contours of the model are such that the intervals between back-projection rays of the image contours in two dimensions from the source and the model surface are minimum (page 385, left-hand column, lines 4-37, steps 1-7): selecting an orientation and a position of the model (i.e., pose T) in the reference referential system (page 385, left-hand column, bottom two paragraphs. Also, see the orientation and position of the model in Figures 4-6 on page 384).

Lavallee does not expressly disclose selecting a deformation of the model to modify its contours in three dimensions. Fleute discloses this as Point Distribution Models (i.e., “deformation model built from the statistical analysis of examples of the object being modeled”) on page 881, lines 3-17.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Fleute with Lavallee. The motivation for doing so is because Lavallee is referring to the error distribution analysis on page 385 left-hand column, under step 7, lines 33-35 by suggesting the use of statistical model (page 387, right-hand column, last paragraph, “compute a matching score by looking at the residual error function”. Also, because statistical model of Fleute are used in the context of deforming the model in three dimensions, and this deformation necessarily results in a modification of the contours. Therefore, it would have been obvious to combine Fleute with Lavallee to obtain the invention as specified in claim 1.

With regard to **claim 2** Lavallee discloses model that is obtained based on an object population for which the statistical correspondence common to all objects is searched to determine an average shape and the main deformations with respect to this average shape, to have at least one statistical model (page 385, left-hand column, lines 4-37 and note that the statistical models are conventional in the art as disclosed by the applicant).

With regard to **claim 3** Lavallee discloses the iterative selection steps (steps 1-7 on page 385) consist of submitting the statistical model modifying its position.

With regard to **claim 4** Lavallee discloses image contours in two dimensions are automatically obtained by projecting the model in the image plane in two dimensions and by deforming the projected contours to have them coincide with the points of strong grey level gradient of the two-dimensional image (page 380, right-hand column, section C; Also, see sections VII (B on page 383) and C on page 385).

With regard to **claim 5** Lavallee discloses automatic determination of the image contours in two dimensions is performed iteratively, each iteration being interposed between two successive iterations of

Art Unit: 2621

the selection steps (see obtaining the image contour in Figure 5 on page 384 and on page 385 left-hand column bottom two paragraphs).

With regard to **claim 6** Lavallee discloses additional reference points for the iterative position, orientation, and deformation selection steps (30-40 points at step 3 on page 385. These points are additionally picked if the iteration goes more than once).

With regard to **claim 7** Lavallee discloses of using several two-dimensional images for which the respective positions of the shooting source are all determined the reference referential system, and of performing the iterative selection steps while taking account of the back-projection rays of the contours of all the two-dimensional image (see figure 2 on page 380 and left-hand column).

With regard to **claim 8** Lavallee discloses number of used images is a function of the desired accuracy on page 380 at top of right-hand column.

With regard to **claim 9** Lavallee discloses the model surface formed of triangle elements (as seen in Figure 1 on page 378).

With regard to **claim 10** Fleute discloses restoring of the surface contours of several objects linked together by rigid and/or resilient transformation relations (as seen in Figure 3 on page 881).

With regard to **claim 11** Fleute and Lavallee discloses restoring of bone images (see Figure 2 and 1, respectively).

**Claim 12** recites identical features as claim 1 except claim 12 is a system claim. Thus, arguments similar to that presented above for claim 1 is equally applicable to claim 12.

**Claim 13** recites identical features as claim 4. Thus, arguments similar to that presented above for claim 4 is equally applicable to claim 13.

**Claim 14** recites identical features as claim 4. Thus, arguments similar to that presented above for claim 4 is equally applicable to claim 14.

**Claim 15** recites identical features as claim 6. Thus, arguments similar to that presented above for claim 6 is equally applicable to claim 15.

**Claim 16** recites identical features as claim 6. Thus, arguments similar to that presented above for claim 6 is equally applicable to claim 16.

**Claim 17** recites identical features as claim 7. Thus, arguments similar to that presented above for claim 7 is equally applicable to claim 17.

**Claim 18** recites identical features as claim 7. Thus, arguments similar to that presented above for claim 7 is equally applicable to claim 18.

**Claim 19** recites identical features as claim 9. Thus, arguments similar to that presented above for claim 9 is equally applicable to claim 19.

**Claim 20** recites identical features as claim 9. Thus, arguments similar to that presented above for claim 9 is equally applicable to claim 20.

#### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 4,630,203 – Contour Radiography: A system for determining 3-dimensional contours of an object from its 2-dimensional images.

US 5,905,809 – Method and apparatus for computed tomography.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali D. Patel whose telephone number is 571-272-7396. The examiner can normally be reached on M-F 8:00am - 5:00pm (First Friday Off).

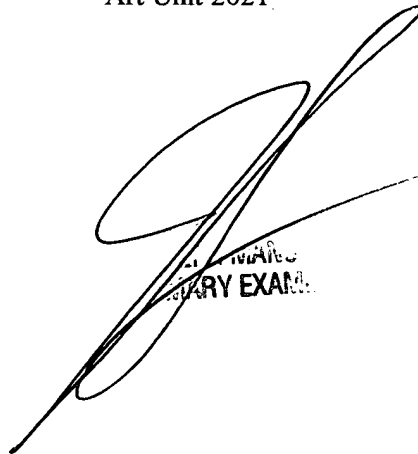
Art Unit: 2621

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shefali D Patel  
Examiner  
Art Unit 2621

August 3, 2005



Handwritten signature of Shefali D Patel. Below the signature, there is a faint, partially obscured stamp that appears to read "PRIMARY EXAMINER".